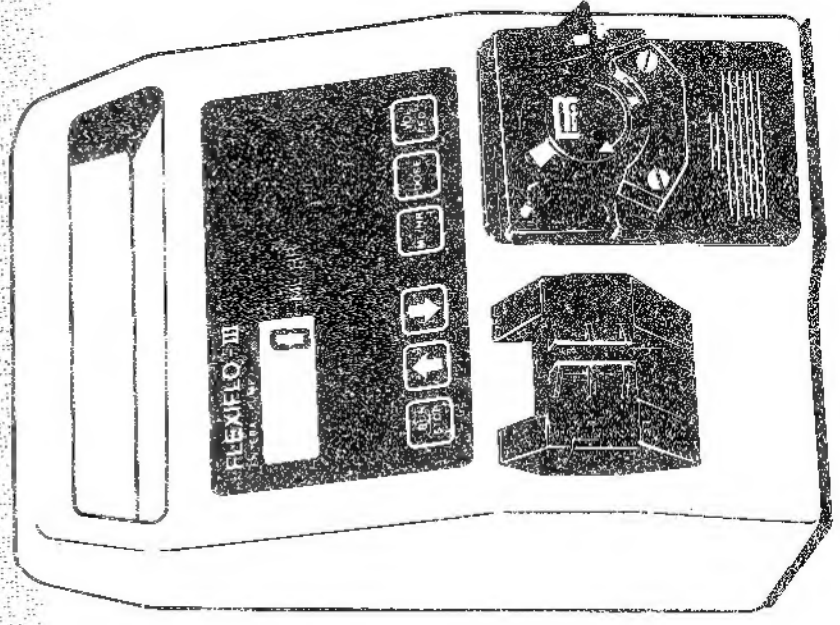


Flexiflo III Enteral Infusion Pump

Operating Manual

For Enteral Use Only
Not For Parenteral Use



ROSS
MEDICAL
NUTRITIONAL
SYSTEM®

ROSS PRODUCTS DIVISION
ABBOTT LABORATORIES
COLUMBIA, O 610 43275-1724 USA

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Uniquely designed and constructed, the FLEXIFLO-III Enteral Nutrition Pump is a micro-processor (computer)-controlled, rotary peristaltic pump that provides accurate delivery rates and has large, easy-to-read displays and simple controls. The FLEXIFLO-III Pump is used with other components of the FLEXIFLO Enteral Delivery System to provide safe, accurate control of enteral feeding at an affordable cost.

PRECAUTION: This pump is designed to deliver only a liquid enteral feeding product (standard liquid product, instant formula, or reconstituted powder product that has been thoroughly mixed into solution).

The FLEXIFLO-III Pump offers features such as:

1. No-flow alarm (tube occlusion/empty condition)
2. Accuracy to $\pm 10\%$ with enteral products (see page 13 for details)
3. Fully charged battery operates for approximately 8 hours at 300 mL/Hr
4. Low-battery alarm
5. Flow rate selection from 1 to 300 mL/Hr in 1 mL/Hr increments
6. Volume fed accumulation display
7. Dose setting
8. Self-checking capability
9. Automatic reversion of valves until pump power is turned off
10. Sequential controls that prevent inadvertent rate changes

LIMITED WARRANTY NOTES

Ross Products Division, Abbott Laboratories warrants the FLEXIFLO®-III Enteral Nutrition Pump against defects in material and workmanship for a one (1) year period from date of delivery. This warranty is valid only to the original purchaser and does not extend to any product, or part thereof, which has been subjected to accident, alteration, damage, misuse, repair by other than Ross authorized representatives, or has not been operated and maintained in the manner prescribed in the Operating Manual or which at the time of pump failure was being used with pump sets or containers other than Ross pump sets and containers. Examples of damage or misuse include, but are not limited to, pumps that have been dropped, have had fluid spilled into or onto the casing, have been submerged or have had the back removed.

In no event shall Ross be liable for any incidental, indirect or consequential damages in conjunction with the purchase or use of the pump.

Ross reserves the right to repair or replace (at its option) any pump that fails to meet the foregoing warranty.

THE WARRANTIES HEREUNDER ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

The FLEXIFLO®-III Pump can be used for adult and pediatric patients provided the patients can tolerate a feeding rate within the pump operational specifications. Those specifications are:

- The flow rate range is 1-300 mL/hr in 1 mL/hr increments
- The flow rate accuracy is $\pm 10\%$ (see page 13 for details).
- The occlusion pressure limit is 23 psi nominal.

If these specifications are not appropriate for a given patient, the FLEXIFLO-III pump should not be used.

CAUTION

Do not use this pump for feeding infants under 12 months of age. In addition, use in all pediatric patients 12 months of age or older must be carefully evaluated. All enteral pumps have the potential to bolus-feed, which is an important consideration in feeding volume-sensitive patients. The rate of feeding should be 25 mL/hr or greater, and a volume of product no more than four times the hourly feeding rate should be hung.

The decision to use this pump in a pediatric patient should be made in conjunction with a pediatrician.

Confirm proper placement and function of the enteral feeding tube before initiating feeding.

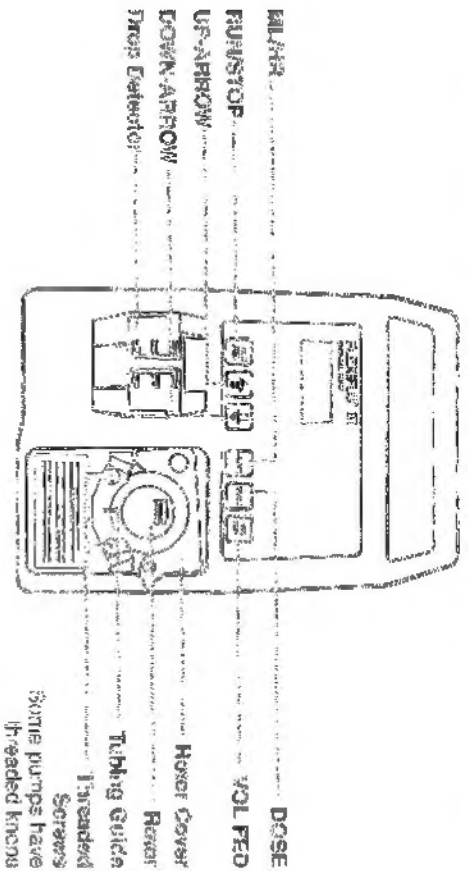
Before leaving a pump-fed patient unattended, verify the following:

1. Rotor and rotor cover are clean. Failure to thoroughly clean product build-up around rotor may cause product overdelivery.
2. Confirm rotor cover moves freely up and down, and returns to a fully closed (down) position before starting pump.
3. Rotor is firmly seated on pump.
4. Confirm that tubing guide is mounted tightly against pump.
5. Pump-set tubing is properly placed on the rotor.
6. Feeding is being administered at the prescribed rate.

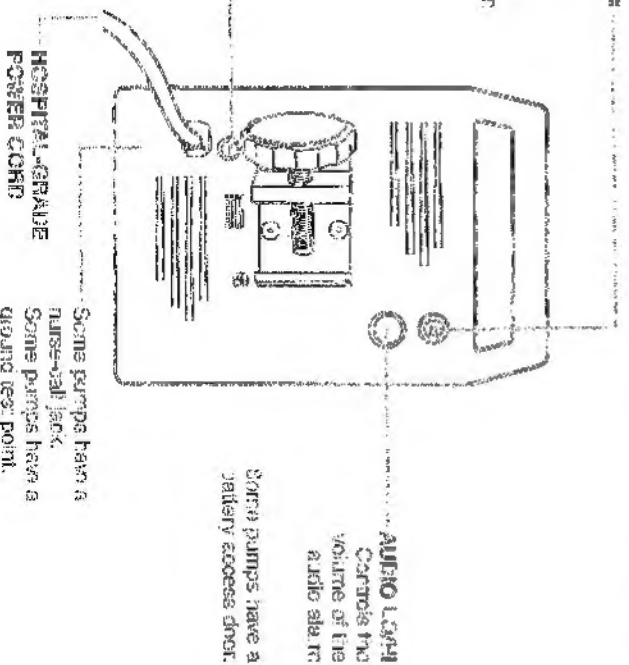
Failure to do so may result in an uncontrolled feeding rate, which may lead to vomiting and/or aspiration.

Pump set and container should be replaced as needed, or at least every 24 hours, to avoid product-contamination problems. For single use only.

Here is a simple explanation of the switches, displays and alarms and their functions. Understanding them is necessary for successful operation of the pump.



DC POWER ON/OFF
Controls the power to the pump.
NOTE: The battery recharges in the CN or OFF position when the power cord is plugged in.



Power
Voltage: 100 to 120 VAC, 45-55 HZ, 1 Phase
Power: 6 watts
Fuse: 1/4 AMP, SMC type
Line Cord: Hospital grade, nonretractable (10 feet)
Package: Less than 100 milligrams

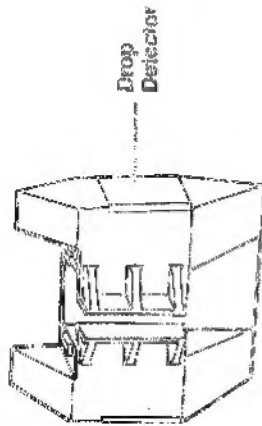
Mechanical
Height: 9.7 inches
Width: 7.0 inches
Depth: 5.5 inches (8.5 inches with pole clamp)
Weight: 7.5 lbs

Operational Specifications—Flow Rates
Range: 1-300 mL/hr
Increment: 1 mL/hr
Accuracy: $\pm 10\%$ with measured flow rates of 1 liter of Envars[®] or Envars[®] (20 to 300 mL/hr) using FLEXIFLOW II Pump set at zero back pressure (atmospheric).
Individual accuracy ranges beyond this value may be encountered due to the viscosity of the enteral product and the pump set used. To check, see page 10.
Conduction Pressure: 25 psi nominal

Battery Operation
Type: Rechargeable sealed lead acid
Voltage: 12V
Expected life: With fully charged, approximately 8 hours at 300 mL/hr.
The battery manufacturer recommends that the battery be used at least once every six months for best performance and battery life. After extended storage periods and before initial use on battery power, the pump must be plugged into an AC power source for a minimum of 12 to 16 hours.
Standards:
Designed and manufactured to meet requirements of UL 544 (1970).

DROP DETECTOR

- * Clean with cotton swab and warm, soapy water. Dry thoroughly. Be sure no soap film or residue is left on lenses. DO NOT CLEAN WITH ALCOHOL.



- * The pump should be stored away from excessive heat, cold or humidity.
- * Be sure ON/OFF switch is in the OFF position.

This FLEXIFLO® II pump is highly reliable. As with any electromechanical device, however, minor problems may occur. In the event of a pump malfunction, need for technical assistance or parts, please contact Ross Products Division, Abbott Laboratories.

BEFORE CALLING, DO A FEW SIMPLE CHECKS:

1. Check for proper electrical hookup. (Is pump plugged in? Is electrical outlet functioning? Is battery properly charged?)
 2. Be certain that the DC power ON/OFF switch on rear panel of pump is ON.
 3. Be sure the FLEXIFLO-II Pump Set tubing is properly positioned over the rotor, with each of the plastic connectors in the tube-guide slots, and that the rotor cover is closed.
 4. Be sure that the clamp on the pump set is open fully.
 5. Be sure the drop detector is clean and the sight chamber is not overfilled or covered with a film of product.
 6. Be sure the tubing, pump rotor, rotor cover and drop detector are clean and free of grease, oil and product.
- / Be sure the rotor and rotor cover are properly sealed and that threaded screws on the tubing guide are securely tightened.

FUNCTION:

STOP	Turns pump on or off but does not cause pump to lose DOSE or VOL FED data. Clears all visual and audio alarms.
UP-ARROW	Increases flow rate in mL/hr or DOSE in mL. Operates only in STOP mode.
DOWN-ARROW	Decreases flow rate in mL/hr or DOSE in mL. Also resets the VOL FED to zero. Operates only in STOP mode.
ML/HR (flow rate)	In STOP mode, press ML/HR, then UP-ARROW or DOWN-ARROW to select flow rate. In RUN mode, press ML/HR to display flow rate. Pump will not operate without a setting for ML/HR.
DOSE (volume in mL to be fed)	In STOP mode, press DOSE, then UP- or DOWN-ARROW to select volume to be fed. In RUN mode, press DOSE to recheck what was selected as volume to be fed. (Display holds for 3 seconds.) Pump will operate without a DOSE selected (DOSE set at zero).

VOL FED (volume in mL that has been fed at any time up to when DOSE is reached)

In RUN mode, press VOL FED to recheck the amount that has been fed up to that point. (Display holds for 3 seconds.)
Press DOWN-ARROW to reset volume to zero so that additional product may be fed-up to volume that is set as DOSE.

LED DISPLAY AND AUDIO ALARM:

FUNCTION:

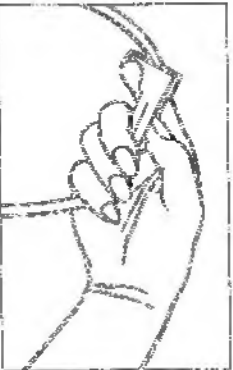
NO FLOW	Pump stops because flow has stopped for some reason. Check for empty container or flow restriction (closed clamp, clogged tubing, etc.).
COVER OPEN	Pump stops if rotor cover is opened.
LOW BATT	Battery voltage is low. Pump will run approximately 30 minutes.
DOSE COMP	Planned total dose has been reached. Pump automatically stops.

To feed additional product, press DOSE, then press UP-ARROW to display desired additional volume to be fed. Press RUN to restart the pump.
To cancel DOSE selection feature and feed additional volume, press DOSE, then press DOWN-ARROW to display zero. Press RUN to restart the pump.

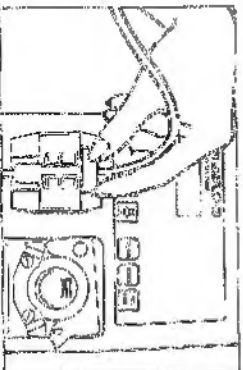
Before initial use on battery power and after extended storage periods, the pump must be plugged into an AC power source for a minimum of 12 to 15 years. The battery manufacturer recommends that the battery be used at least once every six months for best performance and battery life.

Confirm that the tubing guide and rotor are mounted tightly against the pump and the rotor is firmly seated on the shaft. Check that rotor cover moves freely up and down, and returns to a fully closed (down) position before starting the pump.

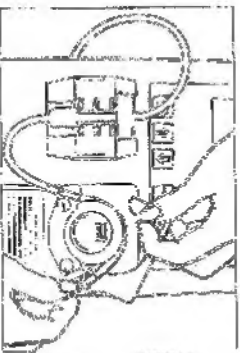
1. Attach pump to stand using pole clamp. Plug in cord if power is available. If using battery power, do not let battery run down. When the LOW BATT message appears, the battery has approximately 30 minutes of energy left.
2. Close CAMP® pump (flow regulator) on FLEXIFLO® II Pump Set.



3. Attach the FLEXIFLO® II Pump Set securely onto filled enteral nutrition container. If it is not preattached, suspend container to left or right of pump.
4. Place sight chamber into drop detector and seat in place.



5. Remove cover from sight chamber. Partially open clamp. Let fluid slowly enter sight chamber to create a reservoir. Do not fill above fill line. (Overfilling will cause a false NO FLOW alarm. Allow product to expand air from tubing, then close clamp. If sight chamber is overfilled, insert container while holding all tubing above sight chamber and confirming open clamp, and allow solution to drain from tubing. Close clamp, suspend container and verify.)
6. Open rotor cover and place fluid past to connector into its left-hand side below the pump rotor.
7. Loop the pump's inset over the pump rotor.



8. Place second plastic connector into the right-hand side below the pump rotor.
9. Close rotor cover and assure that it returns to a fully closed (down) position. Pump will not operate with rotor cover open. DO NOT OPEN COVER AFTER SETUP OR DURING OPERATION.

For trouble-free operation, check the pump daily and clean immediately after spills occur.
While cleaning, pump should be turned off and unplugged.
Do not submerge, soak, or ethylene-bleach the pump.

THE PUMP CAN BE CLEANED AS FOLLOWS:

HOUSING

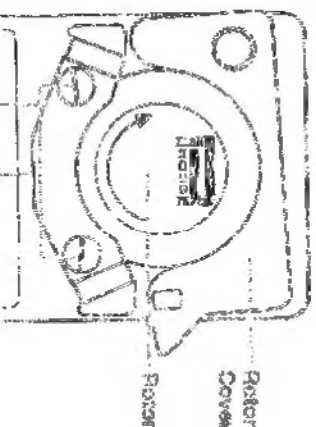
- Clean outside surface with soft cloth and warm, soapy water.
- For general cleaning, use disinfecting detergent (non-chlorine-based) or isopropyl alcohol (not drop detector).
- For general disinfecting, use 70% concentration isopropyl alcohol.
- For disinfecting after exposure to AIDS or hepatitis, use 10% concentration of 5.25% sodium hypochlorite (not sodium bleach). After exposure to tuberculosis, use 40% concentration isopropyl alcohol. These recommendations are not substitutes for official procedures that may differ among institutions.

ROTOR ASSEMBLY

- Remove the tubing guide under the rotor by unscrewing the two threaded screws and pulling the guide straight out.
- Open the rotor cover. Then remove the rotor by pulling it straight out.
- Close rotor cover and remove by pulling it straight out.
- The removal of pieces can be softened in warm, soapy water. Check all four rollers on rotor to be sure each turns freely. Use a soft bristle brush, dental floss or additional coating to free up rollers. After cleaning, rinse and let parts air-dry.

REASSEMBLE THE ROTOR AS FOLLOWS:

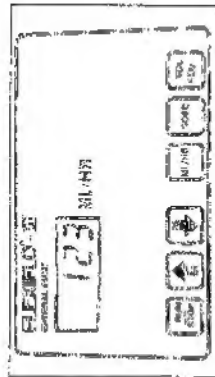
- Put rotor cover on first.
- Attach the part on shaft with fast part on rotor.
- Put rotor on, being sure to seat rotor against the pump by pressing firmly.
- Place tubing guide on threaded posts and tighten screws securely. Failure to do so may result in uncontrollable feeding rate.



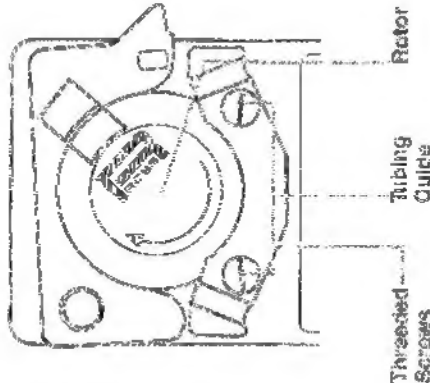
ROTOR COVER, PUMP AND TUBING GUIDE ARE DESIGNED TO BE REMOVED FOR CLEANING.

PROBLEM

Neither UP-ARROW nor DOWN-ARROW responds when switch keys are pressed to increase or decrease ML/Hr, DOSE or VOL FED.



Flow rate is inaccurate.



Flow Rate Setting (ML/Hr)	Approximate Revolutions per Minute
36	1
108	3
180	5
252	7

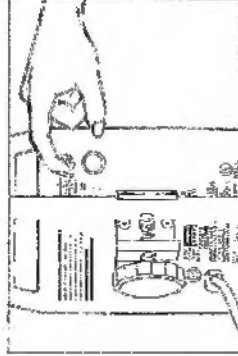
CORRECTIVE ACTION

The UP-ARROW and DOWN-ARROW operate only when the pump is in STOP mode.

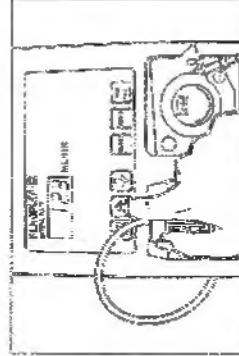
1. To test flow rate, use the following procedure: Be sure to use a graduated cylinder for volume measurement—not an enteral container. Using Ensure® Complete, Balanced Nutrition™, Osmolite® Isotonic Liquid Nutrition or Jevity® Isotonic Liquid Nutrition with Fiber fill the container and set up pump per instructions. Use a FLEXFLO II Pump Set only.
2. Confirm that the tubing guide and rotor are mounted tightly against the pump and the rotor is firmly seated on the shaft.
3. Be sure rotor and cover arm are free from product spillage and all four rollers turn freely.
4. Check that rotor cover moves freely up and down, and returns to a fully closed (down) position before starting the pump.
5. Check rotor speed with a watch. Place two pieces of tape—one on rotor, one on rotor cover—to help count revolutions, per illustration. Check rotor speed against the chart. If necessary, refer to **ROTOR ASSEMBLY**, page 11.
6. Start the pump and run for 15 minutes. Then run product into graduated cylinder for 1 hour and compare to rate set on pump. If flow rate is incorrect, try a new pump set and repeat procedure. Refer to **SPECIFICATIONS**, page 13, for accuracy rate.

10. CONFIRM PROPER PLACEMENT AND FUNCTION OF ENTERAL FEEDING TUBE. Connect adapter to patient's enteral feeding tube (nasogastric, gastrostomy, etc).

11. Open clamp fully.
12. Switch power ON (back of pump). Pump will initiate self-test procedure.

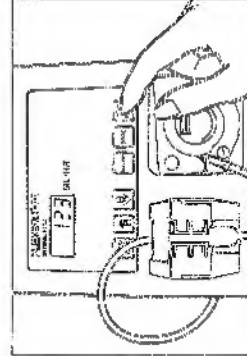


13. Select flow rate (ML/Hr), using UP- or DOWN-ARROW.

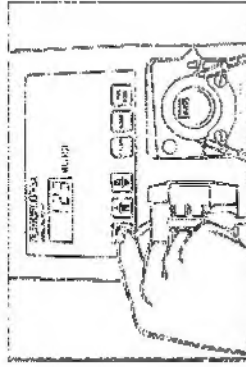


14. If desired, set dose by pressing DOSE switch and then UP- or DOWN-ARROW. Set dose to zero, using DOWN-ARROW to override the DOSE function.

15. Press VOL FED switch and verify that volume is at zero; if not, press DOWN-ARROW to reset volume to zero.



16. Press RUN/STOP switch to start feeding.

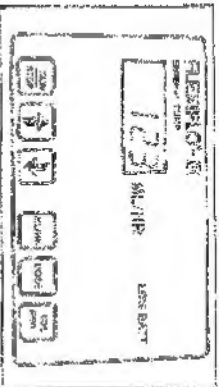


17. When feeding is complete, switch pump off.

NOTE: Pump stops and sounds an alarm automatically when the container is empty. If the DOSE function is in use, the pump will stop, sound the alarm and display the DOSE COMF message when the selected dose is reached.

PROBLEM

LOW BATT display appears when pump is not plugged into a functioning electrical outlet.



CORRECTIVE ACTION

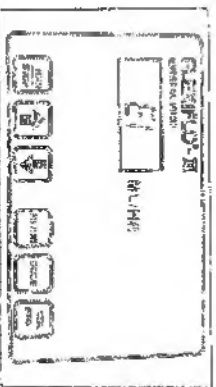
Recharge battery to 12 to 15 volts at a functioning AC outlet. Be sure electrical outlet is functioning by testing with another electrical appliance. If LOW BATT display still appears after 12- to 15-hour recharging, battery servicing is required. (Battery manufacturer recommends that the battery be used at least once every six months for best performance and battery life.)

LOW BATT display appears when pump is plugged into a functioning electrical outlet.



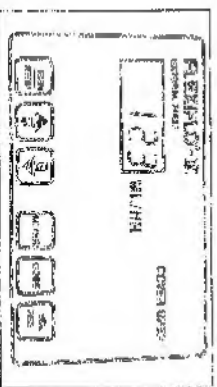
1. Check for blown fuse.
2. Check for defective power cord.

E1, E2, E3 displays appear and pump does not run.



These displays indicate the pump has a self-diagnosed problem and needs technical servicing.

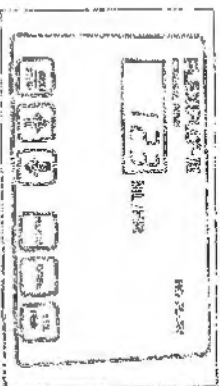
COVER OPEN display is visible.



Be sure no object is keeping the roller cover open.

PROBLEM

NO FLOW display is visible.



CORRECTIVE ACTION

1. If product is not flowing:

a) Be sure clamp on pump set is open.

b) Check for kinked, pinched or occluded pump-set tubing.

c) When using a rigid feeding catheter, replace pump set if air filter is clogged.

d) Check that including feeding tube is not clogged.

2. Be sure that sight chamber on pump set is not more than 1/4 full.

3. Be sure chamber is not empty.

4. Be sure sight chamber is properly sealed two drop detector.

5. Be sure drops are falling down the corner of the sight chamber and not falling down the sight-chamber wall.

6. Be sure sight-chamber well is free from drops of product or control solution.

7. Be sure drop detector windows are not dirty.

8. Be sure pump set is properly bled (refer to INSTRUCTIONS FOR USE).

DOSE COMP display is visible.



Feeding amount entered in DOSE has been reached. Do one of the following:

a) Press RUN/STOP, then increase dose by pressing DOSE and then press UP-ARROW until desired new dose amount is displayed. Now press RUN/STOP switch to restart pump.

b) Press RUN/STOP, then repeat at same dose quantity by pressing VOLUME, then press DOWN-ARROW until zero is displayed. Now press RUN/STOP switch to restart pump.

c) Press RUN/STOP, then clear dose by pressing DOSE, then press DOWN-ARROW until zero is displayed. Now press RUN/STOP switch to restart pump.